

Phys 10154 - Fall 2006 - Exam #9A

Be sure to answer with the proper units and significant figures. Indicate your answers clearly with boxes. **SHOW ALL WORK.** Even if your answer is correct, I will deduct points if I can't see how you solved the problem. Both problems are worth 50 points.

#1. A 7.50-kg wooden block (density = 742 kg/m^3) is released from the bottom of a 12.0-meter deep water tank that is open to the atmosphere. The block has a cross-sectional area of 543 cm^2 .

What is the upward-pushing force that the water exerts on the bottom of the block when the bottom of the block is at a depth of 12.0 meters? Answer with 6 SF.

What is the downward-pushing force that the water exerts on the top of the block when the bottom of the block is at a depth of 12.0 meters (you need to calculate the height of the block)? Answer with 6 SF.

How many seconds after the block is released does it break through the surface of the tank? For simplicity, just assume the distance traveled is 12.0 meters. Answer with 3 SF.

#2. A large tank is open to the air and springs a leak 1.50 meters below the surface. Water flows at a rate that fills up a 1.00 gallon jug in 25.0 seconds. What is the diameter of the hole, in millimeters?

Conversion factors are on your formula sheets.